Off-Puck Scoring Opportunities

Valuing Offensive Player Movement in Ice Hockey

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Model Specification

Motivation

How do players interact with space?

- Creation
- Occupation
- Suppression

What makes space valuable?

- Availability
- Control
- Danger

Setup

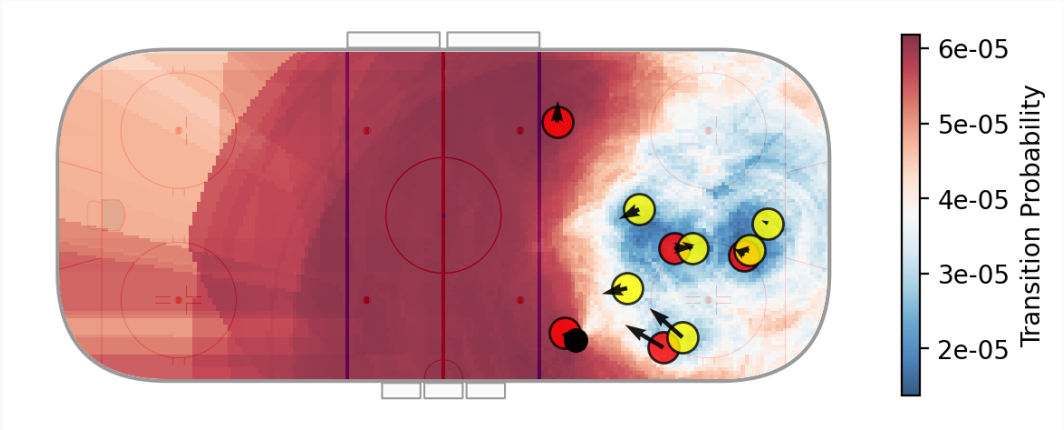
Off-Puck Scoring Opportunity

For any given location on the ice, probability of:

- Attempted pass to location
- Successful control of pass
- Resulting shot is a goal

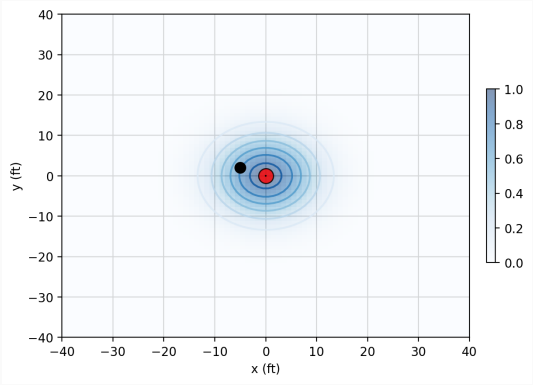
$$\text{OPSO} = \text{Danger} \times \text{Control} \times \text{Availability}$$

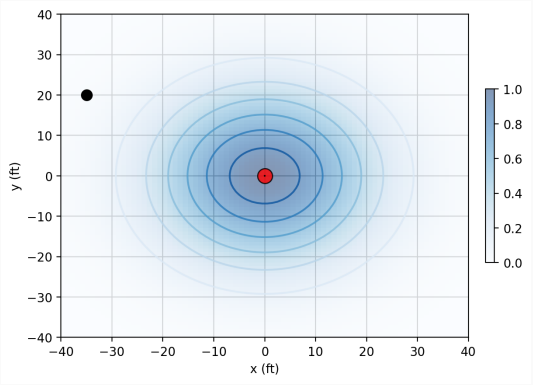
Availability Model



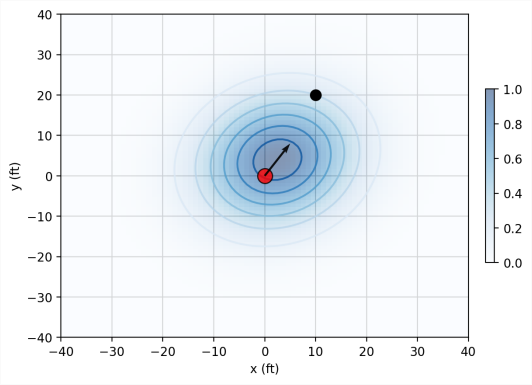
Pass Probability

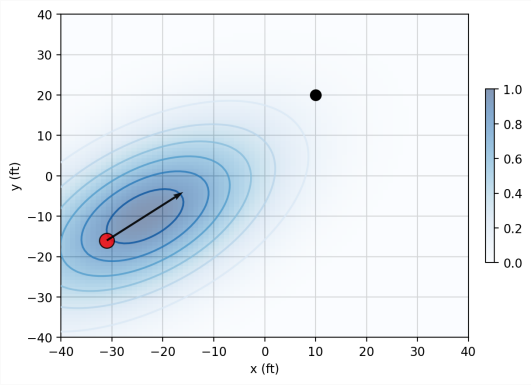
Player Influence



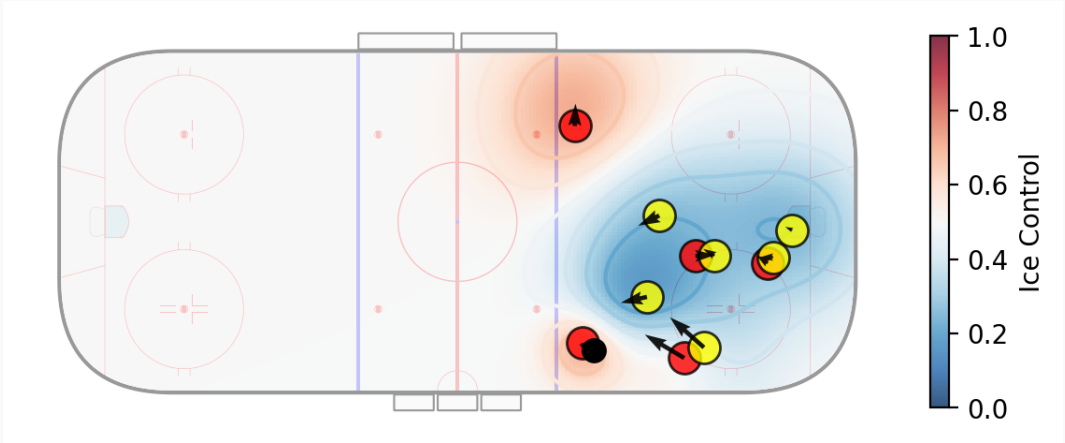


Player Influence



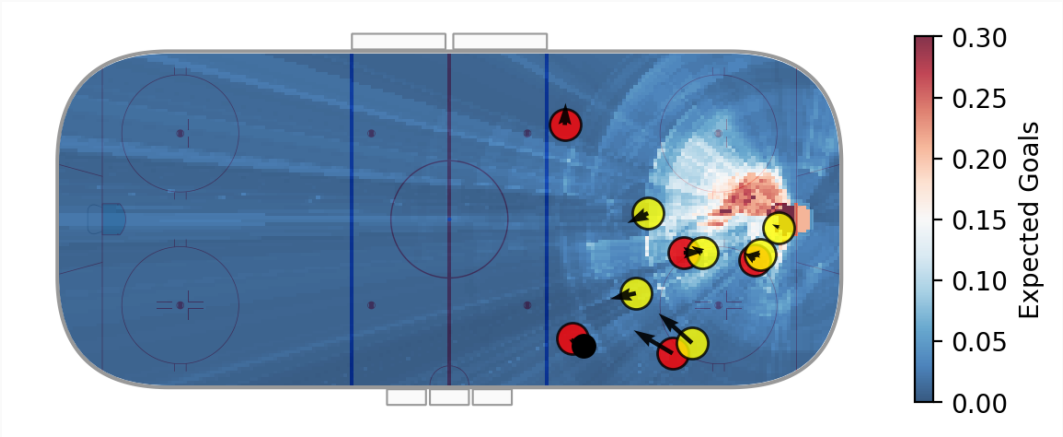


Control Model



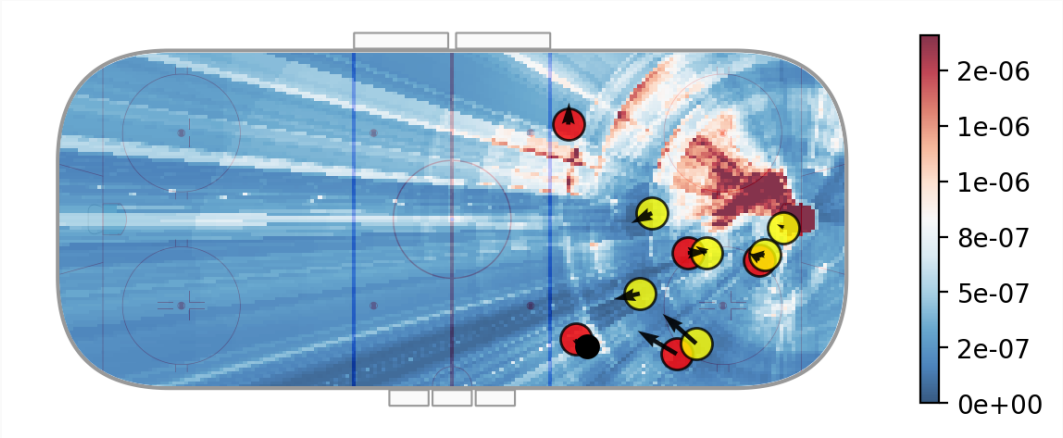
Control Probability

Danger Model



Goal Probability

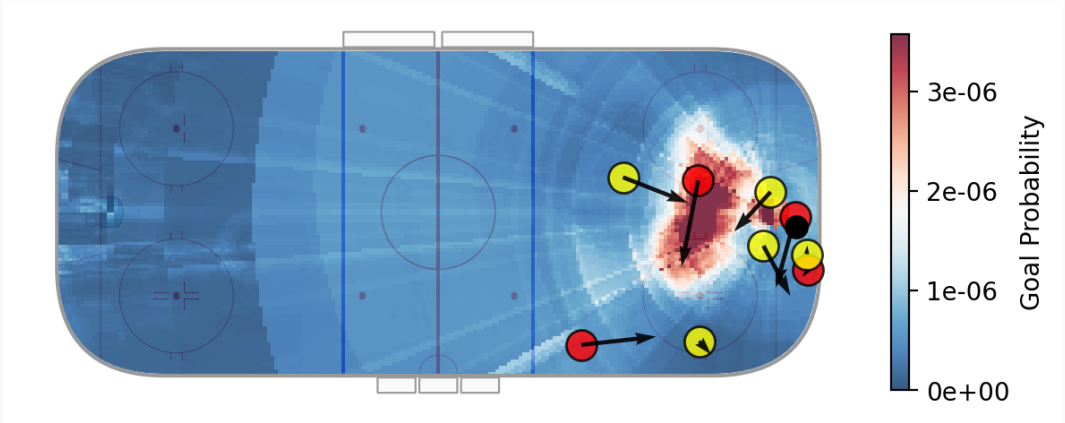
Combined Model



OPSO (0.77%)

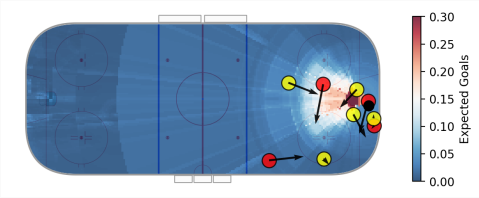
Applications

Play-by-Play Analysis

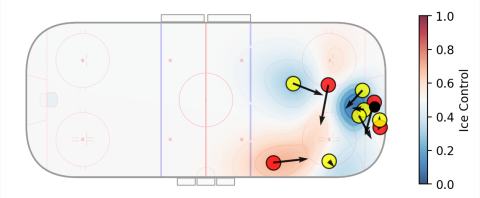


OPSO (1.08%)

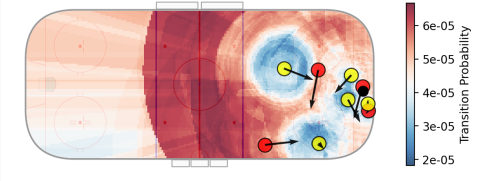
Play-by-Play Analysis



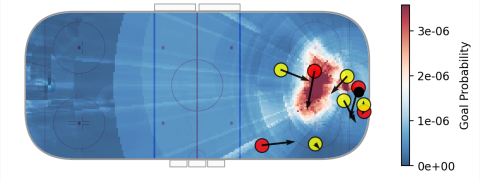
Danger



Control



Availability



Combined

Front Office Applications

Player Evaluation

- Quality of offensive movement
- Space creation with the puck
- Defensive positioning
- Movement patterns & tendencies

Team Evaluation

- Offensive & defensive performance by game
- Zones with high danger created/allowed

Conclusion

OPSO Model

- Interpretable model for valuing space
- Can be used for play-, game- and season-level analysis
- Useful for analysing both offensive and defensive play

Further Work

- Large sample computation
- Relationship with driving offense
- Improvements to danger model

References

[1] Javier Fernandez and Luke Bornn. “Wide Open Spaces: A statistical technique for measuring space creation in professional soccer”. In: MIT Sloan Sports Analytics Conference. 2018.

[2] William Spearman. “Beyond Expected Goals”. In: *Beyond Expected Goals*. MIT Sloan Sports Analytics Conference. 2018.

[3] Hassaan Inayatali and Timothy Chan. “Evaluating Space Creation in the National Hockey League using Puck and Player Tracking Data”. In: *Linköping Hockey Analytics Conference* (July 12, 2024), pp. 13–25. ISSN: 1650-3740. DOI: 10.3384/ecp209002. URL: https://ecp.ep.liu.se/index.php/linhac/article/view/1036 (visited on 02/07/2026).